भारतीय मानक
Indian Standard

IS 17316 (Part 2) : 2019

प्राकृतिक एवं जैविक प्रसाधन सामग्री के घटकों और उत्पादों की तकनीकी परिभाषाओं और मानदंडों पर मार्गदर्शी सिद्धांत

भाग 2 घटकों और उत्पादों के लिए मानदंड

Guidelines on Technical Definitions and Criteria for Natural and Organic Cosmetic Ingredients and Products

Part 2 Criteria for Ingredients and Products

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FOREWORD

This Indian Standard (Part 2) was adopted by the Bureau of Indian Standards after the draft finalized by the Cosmetics Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

This standard is modified in relation to ISO 16128-2 : 2017 'Guidelines on technical definitions and criteria for natural and organic cosmetic ingredients and products — Part 2: Criteria for ingredients and products'. There are two technical deviations in the standard from ISO 16128-2 : 2017 which are given below.

a) In **3.4.1** 'Organic Index', the sentence "leaves, flowers and aerial parts : k = 4.5" has been modified as "leaves, flowers, aerial parts and whole plant : k = 4.5".

b) In **3.4.2** 'Organic Origin Index', the sentence "leaves, flowers and aerial parts : k = 4.5" has been modified as "leaves, flowers, aerial parts and whole plant : k = 4.5".

This standard provides guidelines on definitions and criteria for natural and organic cosmetic ingredients and products. These guidelines are specific to the cosmetics sector, taking into account that most existing approaches written for the agricultural and food sector are not directly transferrable to cosmetics. They apply scientific judgment and offer principles towards a consistent logical framework for natural and organic cosmetic ingredients and products incorporating common approaches employed in existing references. The purpose of these guidelines is to encourage a wider choice of natural and organic ingredients in the formulation of a diverse variety of cosmetic products to encourage innovation.

This Indian Standard is published in two parts. The other part in this series is:

Part 1 Definitions for ingredients

In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

Indian Standard

GUIDELINES ON TECHNICAL DEFINITIONS AND CRITERIA FOR NATURAL AND ORGANIC COSMETIC INGREDIENTS AND PRODUCTS

PART 2 CRITERIA FOR INGREDIENTS AND PRODUCTS

1 SCOPE

1.1 This Indian Standard (Part 2) describes approaches to calculate natural, natural origin, organic and organic origin indexes that apply to the ingredient categories defined in IS 17316 (Part 1). It also offers a framework to determine the natural, natural origin, organic and organic origin content of products based on the ingredient characterization.

1.2 Neither IS 17316 (Part 1) nor this part addresses product communication (for example, claims and labelling), human safety, environmental safety, socio-economic considerations (for example, fair trade), characteristics of packaging materials or regulatory requirements applicable for cosmetics.

1.3 This part builds on and enhances IS 17316 (Part 1). It is intended to be used in conjunction with IS 17316 (Part 1).

2 REFERENCES

The standard given below contains provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the edition indicated was valid. All standards are subjected to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standard given below:

IS No.	*Title*
17316 (Part 1)/ ISO 161281 : 2016	Guidelines on technical definitions and criteria for natural and organic cosmetic ingredients and products: Part 1 Definitions for ingredients

3 APPROACH TO DETERMINE NATURAL, NATURAL ORIGIN, ORGANIC AND ORGANIC ORIGIN INDEXES FOR COSMETIC INGREDIENTS

3.1 General

This clause applies to ingredients, either as defined chemical substances, or as animal, mineral, microorganism or plant materials (in whole, in part or as an extract).

In case of a mixture of two or more ingredients, each ingredient contribution shall be taken separately.

3.2 Extracts

When a solvent is partially evaporated, the producer of the extract may utilize industry best practices (for example, measurement by instrumentation, characterization of solvent volatility, published values of evaporation rates) to determine the index/indices of the extract. The approach and justification for this determination should be made available to interested parties, when requested.

Extracts indexes calculation follow the rules described in **3.3** and **3.4**.

In the case of extracts, the following principles apply when determining indexes.

a) The indexes of finished extracts should reflect the starting materials [that is, ingredient solvent(s) and un-extracted mass].
b) Extracts may be produced from fresh or dried materials.
c) The extraction procedure stops at separation of the extract from the insoluble residue (for example, at filtration). If subsequent operations are performed (for example, dilution, preservation, etc.), their contributions to the indexes are treated as additions of new ingredients.
d) The final extract (for example, in the case of concentration) cannot display more organic or natural content than the starting materials.
e) Reconstitution of dry plants with water to their original fresh mass is allowed. The reconstitution water should be present in the finished extract in order to count towards its natural or organic content.
f) When calculating the organic index, reconstitution water is considered organic while any extraction water in excess is natural.
g) An extract made from non-organic plants has an organic index and organic origin index of 0.

h) Ingredient solvents are defined in IS 17316 (Part 1), Table **A-1**.

j) The use of non-natural ingredients (for example, alcohol denaturants) is allowed in ingredient solvents. However, if the mixture contains a non-natural ingredient solvent, then the entire mixture is non-natural.

3.3 Determination of Natural and Natural Origin Indexes of Ingredients

3.3.1 *Natural Index*

The natural index is a value indicating the extent to which a cosmetic ingredient meets the definition of natural ingredients as given in 2 of IS 17316 (Part 1).

The value is assigned to each ingredient according to the following guidance:

a) *Natural Index = 1* — Ingredient meets the definition of natural ingredients. The natural indexes of constitutive water, reconstitution water, extraction water and formulation water are each considered to equal 1.

b) *Natural Index = 0* — Ingredient does not meet the definition of natural ingredients.

The natural index of extract is calculated according to formula (1):

$$I_n = 1 - \frac{m_{DNS}}{m_T} \qquad (1)$$

Where,

I_n — natural index;

m_{DNS} — mass of derived natural solvent introduced; and

m_T — total mass introduced (natural ingredients and ingredient solvents).

For example, extracts of natural ingredients have a natural index of 1 if the solvents used are natural, including water.

3.3.2 *Natural Origin Index*

The natural origin index is a value indicating the extent to which a cosmetic ingredient meets the definitions of either natural ingredients in **2** of IS 17316 (Part 1), derived natural ingredients from **3** of IS 17316 (Part 1) or derived mineral ingredients from **4** of IS 17316 (Part 1).

The value is assigned to each ingredient according to the following guidance:

a) *Natural Origin Index = 1* — Ingredient meets the definition of natural ingredients, constitutive water, reconstitution water, extraction water or formulation water. Extracts of natural ingredients using ingredient solvents that are natural or derived natural of wholly natural origin [according to IS 17316 (Part 1), Table **A-1**] have a natural origin index of 1.

b) *0.5 < Natural Origin Index ≤ 1* — Ingredient meets the definition of derived natural ingredients or derived mineral ingredients. The value is calculated as the ratio of the natural origin moiety, as determined by molecular mass, renewable carbon content or any other relevant methods, to the total molecular composition of that ingredient.

c) *Natural Origin Index = 0* — Ingredient neither meets the definition of natural ingredients nor derived natural ingredients nor derived mineral ingredients, including those with natural origin indexes calculated to be ≤ 0.5.

3.4 Determination of Organic and Organic Origin Indexes of Ingredients

3.4.1 *Organic Index*

The organic index is a value indicating the extent to which a cosmetic ingredient meets the definition of organic ingredients given in **2.3** of IS 17316 (Part 1).

The value is assigned to each ingredient according to the following guidance:

a) *Organic Index = 1* — Ingredient meets the definition of organic ingredients, constitutive water or reconstitution water.

b) *Organic Index = 0* — Ingredient does not meet the definition of organic ingredients. The organic indexes of both extraction water and formulation water are considered to be equal to 0.

Extracts of organic ingredients in organic ingredient solvents have an organic index of 1. Oily macerates of dried or fresh organic ingredients in organic oil have an organic index of 1. Essential oils and fully dried extracts of organic ingredients have an organic index of 1 if the process solvent follows IS 17316 (Part 1), Table A-2 (because the extraction solvent is removed, it is considered as a process solvent). In other cases, the organic index is calculated according to formula (2):

$$I_o = 1 - \frac{m_{NS} + m_{DNS} + m_{DOS}}{m_T} \qquad (2)$$

Where,

I_o = organic index;

m_{NS} = mass of natural solvent introduced;

m_{DNS} = mass of derived natural solvent introduced;

m_{DOS} = mass of derived organic solvent introduced; and

m_T = total mass introduced (organic ingredients and ingredient solvents).

In order to determine m_{NS} in the above calculation for dried plants when water is used as an ingredient solvent, it is important to subtract the mass of the reconstitution water to represent the mass of the fresh plant.

For extracts of dried plants in which water is used, the extraction water is calculated as formula (3):

$$H_2O_E = m_{H2O} - H_2O_R \qquad (3)$$

Where,

H_2O_E — extraction water;

m_{H2O} — total mass of water introduced;

H_2O_R — is the reconstitution water which is determined as follows:

— when the original fresh plant mass of the dried plant is known, H_2O_R is the lower value between ($m_{FP} - m_{DP}$) and m_{H2O};

— when the original fresh plant mass of the dried plant is not known, H_2O_R is the lower value between ($k \times m_{DP} - m_{DP}$) and m_{H2O};

Where,

m_{FP} — mass of the original fresh plant;

m_{DP} — mass of dried plant;

k — dry/fresh ratio:

— wood, bark, seeds, nuts and roots : $k = 2.5$

— leaves, flowers, aerial parts and whole plant: $k = 4.5$

— water fruits: $k = 8$

or as otherwise specified by the raw material supplier.

3.4.2 *Organic Origin Index*

The organic origin index is a value indicating the extent to which a cosmetic ingredient meets the definitions of either organic ingredients from IS 17316 (Part 1) **2.3**, or derived organic ingredients from IS 17316 (Part 1), **3.2**.

The value is assigned to each ingredient according to the following guidance:

a) *Organic Origin Index = 1* — Ingredient meets the definition of organic ingredients, constitutive water or reconstitution water.

b) *0 < Organic Origin Index ≤ 1* — Ingredient meets the definition of derived organic ingredients. The value is calculated as the ratio of the organic origin moiety, as determined by molecular mass, renewable carbon content or any other relevant methods, to the total molecular composition of that ingredient.

c) *Organic Origin Index = 0* — Ingredient neither meets the definition of organic ingredients nor derived organic ingredients. The organic origin indexes of both extraction water and formulation water are considered to equal 0.

Extracts of organic ingredients in organic or derived organic ingredient solvents have an organic origin index of 1. Oily macerates of dried or fresh organic ingredients in organic or derived organic oil have an organic origin index of 1. Essential oils and fully dried extracts of organic ingredients have an organic origin index of 1 if the process solvent follows IS 17316 (Part 1), Table A-2 (because the extraction solvent is removed, it is considered a process solvent). In other cases, the organic origin index is calculated according to formula (4):

$$I_{oo} = 1 - \frac{m_{NS} + m_{DNS}}{m_T} \qquad (4)$$

Where,

I_{oo} — organic origin index;

m_{NS} — mass of natural solvent introduced;

m_{DNS} — mass of derived natural solvent introduced; and

m_T — total mass introduced (organic ingredients and ingredients solvents).

In order to determine m_{NS} for the above calculations when dried plants are used, it is important to subtract the mass of the reconstitution water from the mass of the extraction water to represent the mass of the plant before drying.

For extracts of dried plants in which water is used, the extraction water is calculated as formula (3):

$$H_2O_E = m_{H2O} - H_2O_R$$

Where,

H_2O_E — extraction water;

m_{H2O} — total mass of water introduced;

H_2O_R — reconstitution water which is determined as follows:

— when the original fresh plant mass of the dried plant is known, H_2O_R is the lower value between ($m_{FP} - m_{DP}$) and m_{H2O};

— when the original fresh plant mass of the dried plant is not known, H_2O_R is the lower value between ($k \times m_{DP} - m_{DP}$) and m_{H2O};

Where,

m_{FP} is the mass of the original fresh plant;

m_{DP} is the mass of dried plant;

k is the dry/fresh ratio:

— wood, bark, seeds, nuts and roots: $k = 2.5$

— leaves, flowers, aerial parts and whole plant: $k = 4.5$

— water fruits: $k = 8$

or as otherwise specified by the raw material supplier.

For extracts, ingredient solvents could be organic, derived organic, natural (including water) or natural derived of wholly natural origin [as indicated in IS 17316 (Part 1), Table **A-1**].

Annex A provides examples of calculation for derived ingredients containing a derived natural or derived organic component. Annex B provides examples of calculation for extracts.

4 APPROACHES TO DETERMINE NATURAL AND/OR ORGANIC CONTENT OF FINISHED COSMETIC PRODUCTS

4.1 Natural Content

4.1.1 *General*

The natural content of a product is the mass percentage, between 0 percent and 100 percent, of all natural ingredients in that product. It is calculated as the sum of the relative concentrations of a product's ingredients multiplied by their corresponding natural indexes. This calculation can be performed either by including formulation water, as in formula (5) or by excluding formulation water, as in formula (6).

4.1.2 *Calculation of Natural Content by Including Formulation Water*

$$C^{\mathrm{N}}_{+\mathrm{H_2O}} = \sum_{\alpha=1}^{n} (P_\alpha \times I_{n\alpha}) \qquad (5)$$

Where,

$C^{\mathrm{N}}_{+\mathrm{H_2O}}$ — natural content of a product, as calculated by including formulation water as an ingredient;

P_α — percentage, by mass, of each ingredient, α, in the product and includes formulation water as an ingredient; and

$I_{n\alpha}$ — natural index corresponding to each ingredient, α, in the product.

4.1.3 *Calculation of Natural Content by Excluding Formulation Water*

$$C^{\mathrm{N}}_{-\mathrm{H_2O}} = \sum_{\beta=1}^{n} \left[\frac{P_\beta}{\left(1 - \dfrac{H_2O_\mathrm{F}\ \text{percent}}{100\ \text{percent}}\right)} \times I_{n\beta} \right] \qquad (6)$$

Where,

$C^{\mathrm{N}}_{-\mathrm{H_2O}}$ — natural content of a product, as calculated by excluding formulation water as an ingredient;

P_β — percentage, by mass, of β, each ingredient except formulation water (H_2O_F) in the product. P_β excludes formulation water as an ingredient (that is, the percentage of formulation water is not part of the numerator);

$I_{n\beta}$ — natural index corresponding to each ingredient, β, in the product; and

H_2O_F, percent — percentage, by mass, of formulation water in the product.

Table 1 Indexes for the Different Categories of Non-Mixture Ingredients

Sl No.	Ingredient Category	Index and Value			
		Natural Index	Natural Origin Index	Organic Index	Organic Origin Index
(1)	(2)	(3)	(4)	(5)	(6)
i)	Constitutive water	1	1	1[1]	1[1]
ii)	Reconstitution water	1	1	1[1]	1[1]
iii)	Extraction water, with exclusion of reconstitution water	1	1	0	0
iv)	Formulation water	1	1	0	0
v)	Natural	1	1	0	0
vi)	Natural mineral	1	1	0	0
vii)	Organic	1	1	1[2]	1[2]
viii)	Derived natural[1]	0	>0.5	0	0
ix)	Derived organic[1]	0	1	0	To be calculated[2]
x)	Derived mineral[1]	0	1	0	0
xi)	Non-natural	0	0	0	0

[1] Annex A shows sample index values and calculations for derived ingredients.

[2] Only if the source material is organic. Otherwise, the value is 0.

4.2 Natural Origin Content

4.2.1 *General*

The natural origin content of a product is the mass percentage, between 0 percent and 100 percent, of all natural ingredients and natural portions of derived natural ingredients in that product. It is calculated as the sum of the relative concentrations of a product's ingredients multiplied by their corresponding natural origin indexes. This calculation can be performed either by including formulation water, as in formula (7) or by excluding formulation water, as in formula (8).

4.2.2 *Calculation of Natural Origin Content by Including Formulation Water*

$$C^{no}_{+H_2O} = \sum_{\alpha=1}^{n}\left(P_\alpha \times I_{no\alpha}\right) \tag{7}$$

Where,

$C^{no}_{+H_2O}$ — natural origin content of a product, as calculated by including formulation water as an ingredient;

P_α — percentage, by mass, of each ingredient, α, in the product and includes formulation water as an ingredient; and

$I_{no\alpha}$ — natural origin index corresponding to each ingredient, α, in the product.

4.2.3 *Calculation of Natural Origin Content by Excluding Formulation Water*

$$C^{no}_{-H_2O} = \sum_{\beta=1}^{n}\left[\frac{P_\beta}{\left(1-\dfrac{H_2O_F\ \text{percent}}{100\ \text{percent}}\right)} \times I_{no\beta}\right] \tag{8}$$

Where,

$C^{no}_{-H_2O}$ — natural origin content of a product, as calculated by excluding formulation water as an ingredient;

P_β — percentage, by mass, of β, each ingredient except formulation water (H_2O_F), in the product. P_β is not calculated for H_2O_F as an ingredient, β, since H_2O_F is excluded from contribution toward natural origin content in this case;

$I_{no\beta}$ — natural origin index corresponding to each ingredient, β, in the product; and

H_2O_F percent — percentage, by mass, of formulation water in the product.

4.3 Organic Content

4.3.1 *General*

The organic content of a product is the mass percentage, between 0 percent and 100 percent, of all organic ingredients in that product. It is calculated as the sum of the relative concentrations of a product's ingredients multiplied by their corresponding organic indexes. This calculation can be performed either by including formulation water, as in Formula (9) or by excluding formulation water, as in Formula (10).

4.3.2 *Calculation of Organic Content by Including Formulation Water*

$$C^{O}_{+H_2O} = \sum_{\gamma=1}^{n}\left(P_\gamma \times I_{o_\gamma}\right) \tag{9}$$

Where,

$C^{O}_{+H_2O}$ — organic content of a product, as calculated by including formulation water as an ingredient;

P_γ — percentage, by mass, of each ingredient, γ, in the product and includes formulation water as an ingredient; and

I_{o_γ} — is the organic index corresponding to each ingredient, γ, in the product.

4.3.3 *Calculation of Organic Content by Excluding Formulation Water*

$$C^{O}_{-H_2O} = \sum_{\delta=1}^{n}\left[\frac{P_\delta}{\left(1-\dfrac{H_2O_F\ \text{percent}}{100\ \text{percent}}\right)} \times I_{o\delta}\right] \tag{10}$$

Where,

$C^{O}_{-H_2O}$ — organic content of a product, as calculated by excluding formulation water as an ingredient;

P_δ — percentage, by mass, of δ, each ingredient except formulation water (H_2O_F), in the product. P_δ is not calculated for H_2O_F as an ingredient, δ, since H_2O_F is excluded from contribution toward organic content in this case;

$I_{o\delta}$ — organic index corresponding to each ingredient, δ, in the product; and

H_2O_F percent — percentage, by mass, of formulation water in the product.

4.4 Organic Origin Content

4.4.1 *General*

The organic origin content of a product is the mass percentage, between 0 percent and 100 percent, of all organic ingredients and organic portions of derived organic ingredients in that product. It is calculated as the sum of the relative concentrations of a product's ingredients multiplied by their corresponding organic origin indexes. This calculation can be performed either by including formulation water, as in Formula (11) or by excluding formulation water, as in formula (12).

4.4.2 *Calculation of Organic Origin Content by Including Formulation Water*

$$C^{\mathrm{OO}}_{+\mathrm{H_2O}} = \sum_{\gamma=1}^{n}\left(P_\gamma \times I_{\mathrm{oo}_\gamma}\right) \qquad (11)$$

Where,

$C^{\mathrm{OO}}_{+\mathrm{H_2O}}$ — organic origin content of a product, as calculated by including formulation water as an ingredient;

P_γ — percentage, by mass, of each ingredient, γ, in the product and includes formulation water as an ingredient; and

I_{oo_γ} — organic origin index corresponding to each ingredient, γ, in the product.

4.4.3 *Calculation of Organic Origin Content by Excluding Formulation Water*

$$C^{\mathrm{OO}}_{-\mathrm{H_2O}} = \sum_{\delta=1}^{n}\left[\frac{P_\delta}{\left(1-\frac{H_2O_F\ \text{percent}}{100\ \text{percent}}\right)} \times I_{\mathrm{oo}\delta}\right] \qquad (12)$$

Where,

$C^{\mathrm{OO}}_{-\mathrm{H_2O}}$ — organic origin content of a product, as calculated by excluding formulation water as an ingredient;

P_δ — percentage, by mass, of each ingredient, δ, in the product and excludes formulation water as an ingredient (for example, the percentage of formulation water is not part of the numerator);

$I_{\mathrm{oo}\delta}$ — organic origin index corresponding to each ingredient, δ, in the product; and

H_2O_F percent — percentage, by mass, of formulation water in the product.

Annex C shows calculation examples of each content calculations in a finished cosmetic products.

ANNEX A

(*Informative*)

EXAMPLES OF CALCULATIONS TO DETERMINE INDEXES OF INGREDIENTS CONTAINING A DERIVED NATURAL OR ORGANIC COMPONENT

Table A-1 Examples of Calculations to Determine Indexes of Ingredients Containing a Derived Natural or Organic Component

Ingredient Type	**Example** (all percentages listed are percent mass fraction)	**Natural Index**	**Natural Origin Index**	**Organic Index**	**Organic Origin Index**
Derived natural	C_{18-38} Alkyl Beeswax: Made by reacting 45 percent C_{18-38} alkyl alcohols from naphtha (non-natural) with 55 percent C_{24-36} beeswax acid (organic)	0	0.55	0	0
Derived organic	Stearyl Beeswax: Made by reacting 35 percent stearyl alcohol from animal fat (organic) with 65 percent C_{24-36} beeswax acid (organic)	0	1	0	1
Derived organic	Butyl Avocadate: Made by reacting 70 percent butyl alcohol (natural) with 30 percent avocado fatty acids (organic)[1]	0	1	0	0.3
Non-natural	PPG-6 Castorate: Made by reacting 30 percent castor oil (natural) with 70 percent PPG-6 (non-natural)[2]	0	0	0	0
Non-natural	Silica silylate: Made by reacting 57 percent silicone dioxide (natural – mineral) with 43 percent methylsilane (from 67 percent natural – mineral, and 33 percent non-natural reactants)[3]	0	0	0	0

[1] There is no minimum concentration requirement for organic source material used to make derived organic ingredients.

[2] There is a maximum content limit for fossil fuel source material used to make derived natural ingredients (<50 percent).

[3] Substances made from mineral sources should have the same chemical composition as a naturally occurring mineral in order to be considered derived mineral ingredients. In this case, although the bulk of the ingredient (approximately 86 percent) is made from natural–mineral reactants, silica silylate is considered non-natural because it does not occur in nature.

ANNEX B

(*Informative*)

EXAMPLES OF ORGANIC INDEX AND ORGANIC ORIGIN INDEX DETERMINATION FOR EXTRACTS

Example 1

Extract 34.4 kg of organic dry flowers by 601 kg of water to obtain 500 kg of extract

Calculation (*see* **4.4**)

H_2O_E = extraction water

H_2O_R = reconstitution water = min ($k \times m_{DP} - m_{DP}$) and H_2O (original fresh mass of the dried plant not known), k = 4.5 for dried flowers

m_{H2O} = total mass of water introduced = 601 kg

I_o = organic index = $1 - (m_{NS} + m_{DNS} + m_{DOS})/m_T$

m_{NS} = mass of natural solvent introduced

m_{DNS} = mass of derived natural solvent introduced = 0 kg

m_{DOS} = mass of derived organic solvent introduced = 0 kg

I_o = organic index

m_T = total mass introduced (organic plants + solvents) (34.4 + 601) kg

H_2O_R = min (4.5 × 34.4 – 34.4); 601) =120

$m_{NS} = H_2O_E = 601 - 120 = 481$

I_o = organic index = $1 - (m_{NS} + m_{DNS} + m_{DOS})/m_T = 1 - 481/(34.4 + 601) = 0.24$

Example 2

Extract 67.5 kg of organic fresh flowers by 200 kg steam to obtain 100 kg of hydrolate

Calculation of the Organic Index, I_o (*see* **4.4**)

m_{NS} = mass of natural solvent introduced

m_W = total mass of water introduced

m_{NS} = mass of natural solvent introduced

$m_{NS} = m_{H2O} = E = 100$

I_o = organic index = $1 - (m_{NS} + m_{DNS} + m_{DOS})/m_T = 1 - 200/(67.5 + 200) = 0.25$

Example 3

Extract 10.3 kg of organic dry flowers by 110 kg of non-organic vegetable oil to obtain 100 kg of extract

Calculation of the Organic Index, I_o (*see* **4.4**)

H_2O_R = Reconstitution water = 0

m_{NS} = Mass of natural solvent introduced = 110 kg

m_T = Total mass introduced (organic plants + solvents): (10.3 + 110) kg

I_o = organic index = $1 - (m_{NS} + m_{DNS} + \mathrm{m}_{DOS})/m_T = 1 - 110/(10.3 + 110) = 0.08$

Example 4

Extract 15 kg of organic fresh fruit by 55 kg of organic ethanol and 55 kg water to obtain 100 kg of extract

Calculation of the Organic Index, I_o (*see* **4.4**)

I_o = organic index = $1 - (m_{NS} + m_{DNS} + m_{DOS})/m_T$

m_T = total mass introduced (organic plants + solvents) = $(m_{FP} + m_{NS} + m_{DNS} + m_{DOS})$

m_{FP} = mass of original fresh plant = 15 kg (organic fresh fruit)

m_{NS} = mass of natural solvent introduced = 55 kg (water)

m_{DNS} = mass of derived natural solvent introduced = 0 kg

m_{DOS} = mass of derived organic solvent introduced = 0 kg

I_o = organic index

$m_{NS} = H_2O_E = 55$

I_o = organic index = $1 - (m_{NS} + m_{DNS} + m_{DOS})/m_T = 1 - (55)/(15 + 55 + 55) = 0.56$

Example 5

Extract 20.1 kg of organic dry flowers by 191 kg of water and 191 kg of derived organic glycerine to obtain 339 kg of extract

*Calculation of the organic index, I_o and organic origin index, I_{oo} (see **4.4**)* —

m_T = total mass introduced (organic plants + solvents) = (20.1 + 191 + 191) kg

m_{DP} = mass of original dry plant = 20.1 kg (organic dry flowers)

m_{NS} = mass of natural solvent introduced

m_{DOS} = mass of derived organic solvent introduced = 191 kg (derived organic glycerine)

m_{H2O} = total mass of water introduced = 191 kg

H_2O_R = reconstitution water = min ($k \times m_{DP} - m_{DP}$) and H_2O: min (4.5 × 20.1 – 20.1); 191 = 70, k = 4.5 for dried flowers

m_{NS} = mass of natural solvent introduced = H_2O_E = extraction water: 191 – 70 = 121

m_{DOS} = 191

I_o = organic index = 1 – ($m_{NS} + m_{DNS} + m_{DOS}$)/$m_T$ = 1 – (121+191)/(20.1 + 191 + 191) = 0.22

I_{oo} = organic origin index = 1 – ($m_{NS} + m_{DNS}$)/m_T = 1 – (121 + 191)/(20.1 + 191) = 0.70

ANNEX C

(*Informative*)

RESULTS OF INDEX DETERMINATION AND CONTENT CALCULATION FROM CLAUSES 4 AND 5

Table C-1 Results of index determination and content calculation from Clauses 4 and 5

Ingredient	Example	Percent mass fraction	Natural index	Natural content	Natural origin index	Natural origin content	Organic index	Organic content	Organic origin index	Organic origin content
Formulation water	Deionized water	60	1	60	1	60	0	0	0	0
Natural	Vegetable oil	10	1	10	1	10	0	0	0	0
Extract	Extract of 10 kg fresh natural plant by a mix of 60 kg water and 30 kg natural derived glycerine of wholly natural origin	2	0.7	1.4	1	2	0	0	0	0
Mineral	Salt	3	1	3	1	3	0	0	0	0
Derived natural	Ester from 70 percent natural and 30 percent non-natural reactants	5	0	0	0.7	3.5	0	0	0	0
Derived mineral	Titanium dioxide	5	0	0	1	5	0	0	0	0
Organic	Organic vegetable oil	5	1	5	1	5	1	5	1	5
Organic extract	Extract of 10 kg dried organic leaves by a mix of 35 kg water and 70 kg organic ethanol	4	1	4	1	4	1	4	1	4
Derived organic	Ester from 20 percent natural and 80 percent organic reactants	4	0	0	1	4	0	0	0.8	3.2
Non-natural	Silicone oil	2	0	0	0	0	0	0	0	0
Total percent		100	—	—	—	—	—	—	—	—
Formula content (from calculating with formulation water)			—	83.4	—	96.5	—	9.0	—	12.2
Formula content (from calculating without formulation water)			—	58.5	—	91.3	—	22.5	—	30.5

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